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Beverage preferences and associated drinking patterns, consequences and other substance use behaviours

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Abstract: **BACKGROUND:** Studies about beverage preferences in a country in which wine drinking is relatively widespread (like Switzerland) are scarce. Therefore, the main aims of the present study were to examine the associations between beverage preferences and drinking patterns, alcohol-related consequences and the use of other substances among Swiss young men. **METHODS:** The analytical sample consisted of 5399 Swiss men who participated in the Cohort Study on Substance Use Risk Factors (C-SURF) and had been drinking alcohol over the preceding 12 months. Logistic regression analyses were conducted to study the associations between preference for a particular beverage and (i) drinking patterns, (ii) negative alcohol-related consequences and (iii) the (at-risk) use of cigarettes, cannabis and other illicit drugs. **RESULTS:** Preference for beer was associated with risky drinking patterns and, comparable with a preference for strong alcohol, with the use of illicit substances (cannabis and other illicit drugs). In contrast, a preference for wine was associated with low-risk alcohol consumption and a reduced likelihood of experiencing at least four negative alcohol-related consequences or of daily cigarette smoking. Furthermore, the likelihood of negative outcomes (alcohol-related consequences; use of other substances) increased among people with risky drinking behaviours, independent of beverage preference. **CONCLUSIONS:** In our survey, beer preference was associated with risky drinking patterns and illicit drug use. Alcohol policies to prevent large quantities of alcohol consumption, especially of cheaper spirits like beer, should be considered to reduce total alcohol consumption and the negative consequences associated with these beverage types.

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Beverage preferences and associated drinking patterns, consequences and other substance use behaviours

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Background: Studies about beverage preferences in a country in which wine drinking is relatively widespread (like Switzerland) are scarce. Therefore, the main aims of the present study were to examine the associations between beverage preferences and drinking patterns, alcohol-related consequences and the use of other substances among Swiss young men. **Methods:** The analytical sample consisted of 5399 Swiss men who participated in the Cohort Study on Substance Use Risk Factors (C-SURF) and had been drinking alcohol over the preceding 12 months. Logistic regression analyses were conducted to study the associations between preference for a particular beverage and (i) drinking patterns, (ii) negative alcohol-related consequences and (iii) the (at-risk) use of cigarettes, cannabis and other illicit drugs. **Results:** Preference for beer was associated with risky drinking patterns and, comparable with a preference for strong alcohol, with the use of illicit substances (cannabis and other illicit drugs). In contrast, a preference for wine was associated with low-risk alcohol consumption and a reduced likelihood of experiencing at least four negative alcohol-related consequences or of daily cigarette smoking. Furthermore, the likelihood of negative outcomes (alcohol-related consequences; use of other substances) increased among people with risky drinking behaviours, independent of beverage preference. **Conclusions:** In our survey, beer preference was associated with risky drinking patterns and illicit drug use. Alcohol policies to prevent large quantities of alcohol consumption, especially of cheaper spirits like beer, should be considered to reduce total alcohol consumption and the negative consequences associated with these beverage types.

Introduction

Studying preferences for particular alcoholic beverages is meaningful because of their possible association with risky drinking patterns, negative alcohol-related consequences and the consumption of other substances. Given that such associations exist, beverage-specific preventative strategies may be necessary.^{1,2} Various socio-demographic variables, such as sex,^{2–11} age,^{2–4,6,10–13} socio-economic indices^{3,4,14} and a person's home country,^{5,15,16} as well as particular linguistic regions within a multi-lingual country like Switzerland,^{13,17} seem to influence beverage preferences. Such preferences, in turn, affect certain drinking patterns. Relative to wine preference and/or to drinking other types of beverage, a preference for beer has repeatedly been associated with high-volume or binge drinking, drunkenness and a higher probability of developing an alcohol-use disorder.^{1–9,14,18–21}

Studies also have linked preferences for a particular beverage with negative alcohol-related consequences and the use of other substances. Earlier studies have often been criticized for their failure to control for total alcohol intake when studying such associations.²² Nevertheless, others have controlled for this potential confounder and still identified beer consumption as associated with risky behaviours (e.g., driving while or shortly after drinking^{1–3}; drinking-and-driving accidents²³; being involved in fights²; and using or being exposed to cigarettes and marijuana).^{2,8} In contrast, others have postulated that, when total alcohol intake is considered, the effects of any particular beverage type on alcohol-related consequences or the use of other substances mostly or totally disappear.^{9,11,12,14} These diverging results might be due to methodological differences (e.g., age range, assessed outcomes, adjustment for total alcohol intake).

Research gaps clearly remain. Most importantly, the majority of existing studies are limited because, at most, they controlled for total consumed alcohol when studying the association between particular beverage preferences and alcohol-related consequences or the use of other substances, but not for drinking patterns (i.e., the way alcohol is consumed). This can be problematic, as a person who, for instance, drinks two standard drinks per day might differ from a person who drinks seven drinks both on Friday and Saturday, despite having the same weekly alcohol consumption.^{24,25} Secondly, the majority of studies have been conducted in Anglophone countries or in Denmark that, overall, are characterized by beer preference.^{5,15} Hence, despite already-existing scientific publications,^{11,12,20} whether previously demonstrated associations are replicable in Switzerland, in which wine drinking is more widespread,^{5,15} must be investigated further.

Considering the above-mentioned research gaps, the aims of the present study were threefold: (i) to study the relationship between socio-demographic variables and preferences for a particular beverage type among young Swiss men; (ii) to investigate whether preference for a particular beverage type is associated with certain drinking patterns; and (iii) to evaluate whether preference for a particular beverage type is associated with negative alcohol-related outcomes and/or the use of other substances, even after taking drinking pattern into account.

Methods

Study design

The present study builds on data from the 'Cohort Study on Substance Use Risk Factors' (C-SURF). Its protocol was approved

by the Ethics Committee for Clinical Research of Lausanne University Medical School (protocol number 15/07). The sample was obtained between August 2010 and November 2011 at three of a total of six centres that recruit men for military service, covering 21 of 26 cantons (including all French-speaking cantons) in Switzerland. Virtually all Swiss men must go through this recruitment process to determine their eligibility for military, civil or no service around the age of 19. As there is no pre-selection to army conscription, a representative sample of young Swiss men was thereby accessible for the study. Conscripts who provided informed consent were invited to fill out a questionnaire about socio-demographic characteristics and substance use (data collection: September 2010–March 2012).

Participants

Altogether, 1829 of the 15 074 conscripts who presented to one of the three participating recruitment centres were never seen by the research staff (either because they were randomly selected for another study or because they were not informed by military staff about the current study). Of the remaining 13 245 conscripts, 57.1% gave informed consent. Among these 7563 conscripts, 79.2% completed the questionnaire. For the present analysis, 152 men were excluded from analysis owing to missing data. A further 439 conscripts who had not consumed at least one standard drink over the preceding 12 months were excluded. Hence, the analytical sample consisted of 5399 men (German-speaking: 2441; French-speaking: 2958). Compared with German-speaking conscripts (mean age = 19.13, SD = 1.07), French-speaking subjects were older (mean age = 19.76, SD = 1.29; $t_{5396,99} = -19.32$), and already had achieved a higher level of education (German-speaking: 64.7% primary school; 24.3% higher vocational school; 11.0% high school/bachelor's degree; French-speaking: 38.0% primary school; 32.4% higher vocational school; 29.6% high school/bachelor's degree; $X^2_2 = 439.99$). Furthermore, a higher percentage of German- than French-speaking men lived in rural areas (71.3% vs. 53.3%; $X^2_1 = 183.13$).

Measurements

Socio-demographics

Age ('<20 years' vs. '≥20 years'), highest achieved education ('primary school' vs. 'higher vocational school' vs. 'high school/university') and residence ['rural' (<10 000 inhabitants) vs. 'urban' (≥10 000 inhabitants)] were assessed.

Alcohol use

Drinking pattern: This variable was based on questions about the usual quantity and frequency of alcohol use and the frequency of risky single-occasion drinking (RSOD). 'RSOD' was defined as consuming at least six standard drinks (pictures of standard drinks containing 10–12 grams of pure alcohol were provided for reference) on a single occasion, and 'at-risk RSOD' as having such occasions at least monthly. 'At-risk volume drinking' was defined as drinking at least 21 standard drinks per week. The following three drinking patterns were defined:

- (1) *Low-risk consumption:* People that did neither report at-risk RSOD nor at-risk volume drinking;
- (2) *At-risk RSOD or at-risk volume drinking:* People that showed either at-risk RSOD or at-risk volume drinking were grouped together because (i) at-risk volume drinking only occurred rarely (0.3%); (ii) at-risk RSOD and at-risk volume drinking both reflect the presence of a single risky behaviour; and (iii) at-risk RSOD and at-risk volume drinkers were similar with regards to the outcome variables (see below).

- (3) *At-risk RSOD and at-risk volume drinking:* People that reported both of the risky drinking behaviours.

Beverage preference: This variable was constructed on the basis of a drinking diary that encompassed the previous week. Conscripts described the number of standard drinks they had on each day and the number of each beverage type (as prompted by the questionnaire). 'Preference' was defined as consuming at least two-thirds of one's total alcohol consumption as a single particular beverage type.¹² Because our primary interest was studying beer and wine preferences, men with a preference for strong alcohol, ready to drink (RTD) beverages (alcopops, beer pops, wine pops, chillers, coolers) and aperitifs were grouped into the category 'other preferences'. Those individuals who did not fulfilled our preference criteria were labelled as 'mixed choice of beverage'.

Outcomes

All of the following variables refer to the last 12 months:

– *Number of negative alcohol-related consequences:* All participants were asked whether they had experienced any of the following (adapted from reference 26): (i) drinking alcohol/taking drugs/medicine (anything but mere pain killers) to get over any of the bad secondary effects of drinking alcohol; (ii) a mental blackout after drinking alcohol; (iii) doing something while drinking alcohol that was strongly regretted later; (iv) unplanned or (v) unprotected sex because of being drunk; (vi) any accident or injury because of being drunk; (vii) more than one occasion involving some conflict with police/authorities because of consuming alcohol; (viii) any argument or fight, either while drinking alcohol or immediately afterwards; (ix) damaged property because of being drunk; (x) missing school or work or failing to look after family responsibilities more than once; and (xi) driving a car or some other vehicle more than once shortly after having had several alcoholic drinks. A summation score was generated which then was dichotomized into 'experiencing at most three consequences' and 'experiencing at least four consequences'.

– *At-risk cigarette smoking (daily smoking):* Dichotomized into 'no' and 'yes'.

– *At-risk cannabis use (more than once per week):* Dichotomized into 'no' and 'yes'.

– *Any other illicit drugs (excluding cannabis):* 12-month prevalence of at least one of the following illicit drugs, as prompted by the questionnaire: (i) hallucinogenic/magic mushrooms, psilocybin, peyote or mescaline; (ii) other hallucinogens (e.g., LSD, PCP/Angel dust, 2-CB, 2-CI); (iii) salvia divinorum; (iv) speed; (v) amphetamines, metamphetamines or amphetamine sulfates (e.g. Dexedrine, Benzedrin); (vi) crystal meth (ice); (vii) poppers (amyl nitrite, butyl nitrite); (viii) solvent sniffing (e.g. glues, solvents or gases like benzene, ether or nitrous oxide); (ix) ecstasy, MDMA; (x) cocaine, crack, freebase; (xi) heroine; (xii) ketamine (Special K, DXM); (xiii) GHB / GBL / 1-4 butanediol (BDB); (xiv) research chemicals (e.g. mephedrone, butylone and methedrone); and (xv) spices or similar substances.

Statistical analysis

Socio-demographic characteristics of German- vs. French-speaking conscripts were compared via χ^2 analyses and *t*-tests. Logistic regression analyses were used to examine the association between linguistic region and preferences for particular beverage types, adjusted for other socio-demographic variables. (Multinomial) logistic regression analyses were conducted (adjusting for socio-demographic variables) to investigate the associations between beverage preference and drinking pattern,

alcohol-related consequences and other substance use. Additionally, the contributions of drinking pattern to alcohol-related consequences and substance use outcomes were evaluated in adjusted models.

Results

As shown in table 1, approximately every second man had a mixed choice of beverage. Next most common was a preference for beer (31.7%), followed by other preferences (11.5%) and wine (5.4%). Relative to German-speaking men, conscripts from the French-speaking part of Switzerland were more likely to have a mixed choice of beverage or a preference for wine, and less likely to prefer beer. However, in this age group, if a beverage was preferred, it was most often beer in both linguistic regions. Compared with men who already had completed high school/university, fewer conscripts with less education preferred wine. Furthermore, those living in urban areas were less likely to express a beer preference, and more likely to prefer other beverages relative to those living in rural regions.

Table 2 illustrates the results of the multinomial logistic regression. The odds of reporting at-risk RSOD or/and at-risk volume drinking (rather than a low-risk alcohol consumption) was higher among men with a beer preference compared with those men with a mixed choice of beverage. The reverse pattern was identified for conscripts preferring wine. A slightly larger percentage of men from French-speaking regions were simultaneous at-risk RSOD and at-risk volume drinkers relative to men from German-speaking regions. Conscripts who were ≥ 20 years old were less likely to report at-risk RSOD or/and at-risk volume drinking, versus younger conscripts. Compared with those with a high school/university degree, men who had only completed primary school or a higher vocational school were more likely to have both at-risk behaviours simultaneously. A lower percentage of conscripts living in urban areas were either at-risk RSOD or at-risk volume drinkers than those living in rural regions.

Men who expressed preferring wine were less likely to report having experienced at least four alcohol-related consequences or to smoke cigarettes daily than those expressing a mixed choice of beverage (table 3). In contrast, a beer preference or a preference for other beverages was associated with a higher percentage of at-risk cannabis use and with the use of other illicit drugs. Furthermore, relative to low-risk alcohol consumption, the presence of risky drinking patterns was associated with a higher likelihood of experiencing at least four negative alcohol-related consequences, at-risk smoking of cigarettes, at-risk cannabis use and the use of other illicit drugs. Odds ratios were always greater among men with both at-risk drinking behaviours than among conscripts with either at-risk RSOD or at-risk volume drinking alone. Men from the French-speaking region were more often at-risk cannabis users and users of other illicit drugs. Regarding age, a higher percentage of men ≥ 20 years old reported (at-risk) cigarette, cannabis and other illicit drug use. Versus men who had already completed high school or university, conscripts with a lower level of education were more likely to smoke cigarettes daily and use cannabis more than once per week. Furthermore, those who only had finished primary school were more likely to have used other illicit drugs in the past 12 months. Lastly, living in urban areas was associated with a higher percentage of (at-risk) substance use (cigarettes, cannabis and other illicit drugs).

Discussion

The present study examined the relationships between socio-demographic characteristics and preferences for particular alcoholic beverages, as well as associations between beverage preferences and

Table 1 Logistic regression models of beverage preference versus linguistic region and other socio-demographic variables

	% Mixed choice of beverage			% Beer preference			% Wine preference			% Other preference ^c		
	%	OR (CI) ^a	OR (CI) ^b	%	OR (CI) ^a	OR (CI) ^b	%	OR (CI) ^a	OR (CI) ^b	%	OR (CI) ^a	OR (CI) ^b
Total (n = 5399)	51.4			31.7			5.4			11.5		
Linguistic region												
German	45.2	1	1	37	1	1	3.4	1	1	11.1	1	1
French	54.8	1.24 (1.12–1.38)	1.25 (1.11–1.40)	27.3	0.64 (0.57–0.72)	0.68 (0.60–0.77)	7.1	2.13 (1.65–2.76)	1.90 (1.44–2.51)	11.7	1.06 (0.90–1.25)	1.00 (0.84–1.20)
Age												
<20	60.6	51.2	1	32.8	1	1	4.6	1	1	11.4	1	1
≥ 20	39.4	51.7	0.95 (0.85–1.07)	30.1	1.01 (0.89–1.15)	1.01 (0.89–1.15)	6.6	1.24 (0.97–1.59)	1.24 (0.97–1.59)	11.6	0.98 (0.82–1.18)	0.98 (0.82–1.18)
Education												
high school/university	21.2	52.2	1	28.6	1	1	8.6	1	1	10.6	1	1
higher vocational school	28.7	53.5	1.08 (0.93–1.26)	30.2	0.99 (0.84–1.17)	0.99 (0.84–1.17)	4.8	0.57 (0.41–0.78)	0.57 (0.41–0.78)	11.5	1.19 (0.93–1.53)	1.19 (0.93–1.53)
primary school	50.1	49.9	0.97 (0.84–1.12)	33.8	1.08 (0.93–1.27)	1.08 (0.93–1.27)	4.5	0.63 (0.47–0.85)	0.63 (0.47–0.85)	11.8	1.22 (0.97–1.54)	1.22 (0.97–1.54)
Residence												
rural	61.5	51.5	1	33.8	1	1	5.3	1	1	9.4	1	1
urban	38.5	51.3	0.96 (0.86–1.08)	28.4	0.84 (0.74–0.95)	0.84 (0.74–0.95)	5.6	0.88 (0.68–1.12)	0.88 (0.68–1.12)	14.7	1.69 (1.42–2.01)	1.69 (1.42–2.01)

Note: CI = 95% confidence interval.

a: Unadjusted.

b: Adjusted.

c: Preference for strong alcohol, ready to drink beverages or aperitifs.

Table 2 Multinomial logistic regression models of drinking pattern versus beverage preference, linguistic region and other socio-demographic variables

	%	Low-risk consumption	At-risk RSOD or at-risk volume drinking ^a			At-risk RSOD and at-risk volume drinking ^a		
			%	OR (CI) ^b	OR (CI) ^c	%	OR (CI) ^b	OR (CI) ^c
Total (n = 5399)		49.7	43.7			6.6		
Beverage preference								
Mixed choice beverage ^d	51.4	52.7	41.1	1	1	6.2	1	1
Beer preference	31.7	40.7	51.2	1.61 (1.42–1.83)	1.62 (1.42–1.83)	8.1	1.69 (1.33–2.15)	1.71 (1.34–2.18)
Wine preference	5.4	71.7	25.9	0.46 (0.35–0.61)	0.46 (0.35–0.61)	2.4	0.28 (0.13–0.61)	0.29 (0.13–0.63)
Other preferences ^e	11.5	51.2	43.1	1.08 (0.90–1.29)	1.11 (0.92–1.32)	5.7	0.93 (0.64–1.37)	0.95 (0.65–1.39)
Linguistic region								
German	45.2	49.1	44.6		1	6.3		1
French	54.8	50.3	43		1.04 (0.92–1.17)	6.8		1.30 (1.02–1.65)
Age								
<20	60.6	47.9	45.1		1	7		1
≥20	39.4	52.6	41.5		0.86 (0.76–0.97)	5.9		0.77 (0.61–0.98)
Education								
High school/university	21.2	50.5	45.2		1	4.3		1
Higher vocational school	28.7	48.5	43.5		0.95 (0.81–1.12)	7.9		1.89 (1.33–2.70)
Primary school	50.1	50.1	43.2		0.87 (0.75–1.01)	6.7		1.50 (1.07–2.12)
Residence								
rural	61.5	48	45.1		1	6.8		1
urban	38.5	52.5	41.4		0.85 (0.76–0.96)	6.1		0.86 (0.68–1.09)

Note: CI = 95% confidence interval; RSOD = risky single occasion drinking.

a: Low-risk consumption used as reference category.

b: Unadjusted.

c: Adjusted.

d: Not drinking 2/3 of the total alcohol consumption as a single beverage type.

e: Preference for strong alcohol, ready to drink beverages or aperitifs.

drinking patterns, alcohol-related consequences and the use of other substances by young Swiss men. As in earlier studies, young men most commonly had a mixed choice of beverage or reported a preference for beer,^{4,9,12,27} both in the German- and French-speaking parts of Switzerland. Furthermore, we found differences between linguistic regions in terms of beverage preferences. In line with earlier investigations,^{1–5,7–9,14,18–21} beer was associated with risky and wine with moderate drinking patterns. In addition, a preference for beer or strong alcohol/RTD beverages/aperitifs was associated with negative, and a wine preference with positive outcomes, in terms of alcohol-related consequences and/or using other substances.

Linguistic region was associated with beverage preference insofar as more men from German-speaking regions preferred beer, and more conscripts from French-speaking regions had a preference for wine, a pattern that was replicable when the consumed volume of a particular beverage was compared between the two linguistic regions (results not presented). No differences between the linguistic regions were identified with regards to total alcohol intake (results not presented). Altogether, our results contradict earlier Swiss studies in which residents of French-speaking regions not only drank more alcohol overall, but also considerably more wine and slightly more beer than residents of German-speaking regions.^{13,17} Admittedly, these inconsistencies may be due to methodological differences (e.g., our study focused on young adults, while these other studies included people ages 15 to 74 and older).

The result that beer was associated with riskier drinking behaviour, whereas a preference for wine seemed to reflect a more moderate drinking style may be explained as follows: beer is affordable for young men and is possibly, relative to drinking wine, more frequently consumed outside of home (i.e., in situations conducive to risky drinking behaviour).^{5,8,18,27} Accordingly, Kuntsche *et al.*²⁰ described how those who like to

have fun and get drunk tend to drink beer to become intoxicated, whereas adolescent wine drinkers generally like to conform to drinking norms and, thus, drink moderately. In-line with these assumptions we found that, even after adjusting for at-risk RSOD and/or volume drinking, preferential wine drinkers reported fewer alcohol-related consequences. Lastly, it is possible that men with a beer versus wine preference differed in additional personal characteristics not included in our analyses, and that these factors increased or decreased the likelihood of risky drinking.^{7,14,18}

Even after controlling for drinking pattern, a preference for beer or for other beverages was associated with the use of illicit drugs. That beer preference predicts the use of other substances has been described in earlier studies as well.^{2,8} Furthermore, the associations found for 'other beverages' were presumably attributable to a preference for strong alcohol,² which was most often represented in this preference category (strong alcohol: 83.2%; RTD beverages: 12.1%; aperitifs: 4.7%). As for drinking pattern, it can be assumed that the above-mentioned results occurred because men with a preference for beer or strong alcohol belong to a particular subculture that demonstrates especially problematic substance use due to personal characteristics.^{14,18} Consistent with prior studies,^{2,8} men who preferred wine were less likely to experience a critical number of negative alcohol-related consequences or to smoke cigarettes on a daily basis. Among others, the former result might be explained by wine often being consumed during meals, whereby blood alcohol concentrations may be lower than for other types of beverage that are less frequently accompanied by food intake.¹⁸

A person's drinking pattern was even more predictive of the outcomes we assessed than beverage preference, a finding that also is compatible with earlier investigations.^{9,11,12,14} In other words, the association between the presence of one or, even more pronouncedly, two risky drinking behaviours and either negative

Table 3 Logistic regression models of negative consequences and substance use (cigarettes, cannabis, other illicit drugs) versus beverage preference, drinking pattern, linguistic region and other socio-demographic variables

	%		≥ 4 alcohol-related consequences		Cigarettes: at-risk smoking (daily)		
	100	17.7	OR (CI) ^a	OR (CI) ^b	22.2	OR (CI) ^a	OR (CI) ^b
Total (n = 5399)							
Beverage preference							
Mixed choice beverage ^c	51.4	17.9	1	1	21.8	1	1
Beer preference	31.7	18.8	1.06 (0.90–1.23)	0.85 (0.72–1.00)	23.7	1.11 (0.96–1.28)	1.05 (0.91–1.22)
Wine preference	5.4	7.2	0.35 (0.22–0.56)	0.50 (0.31–0.80)	10.9	0.44 (0.30–0.64)	0.51 (0.35–0.75)
Other preferences ^d	11.5	18.7	1.06 (0.84–1.32)	1.04 (0.81–1.32)	25	1.20 (0.98–1.47)	1.16 (0.94–1.43)
Drinking pattern							
Low-risk consumption	49.7	5.9		1	16.9		1
At-risk RSOD or volume drinking	43.7	26		5.64 (4.68–6.80)	25.2		1.69 (1.47–1.95)
At-risk RSOD and volume drinking	6.6	52.3		17.52 (13.43–22.86)	41.5		3.43 (2.70–4.36)
Linguistic region							
German	45.2	18.4		1	21.1		1
French	54.8	17.2		0.91 (0.77–1.07)	23.1		1.13 (0.98–1.30)
Age							
<20	60.6	17.8		1	19.2		1
≥20	39.4	17.6		1.12 (0.96–1.32)	26.7		1.65 (1.44–1.90)
Education							
High school/university	21.2	18		1	13.1		1
Higher vocational school	28.7	19		1.18 (0.94–1.47)	27.2		2.52 (2.04–3.11)
Primary school	50.1	15.4		1.16 (0.94–1.43)	23.1		2.34 (1.91–2.88)
Residence							
Rural	61.5	17.8		1	21.1		1
Urban	38.5	17.5		1.07 (0.92–1.26)	23.9		1.22 (1.06–1.40)
	%		Cannabis: at-risk use (> weekly)		Use of any illicit drugs (excluding cannabis) over the past 12 months		
		%	OR (CI) ^a	OR (CI) ^b	%	OR (CI) ^a	OR (CI) ^b
Total (n = 5399)		10.2			11.3		
Beverage preference							
Mixed choice beverage ^c	51.4	8.9	1	1	9.8	1	1
Beer preference	31.7	11.8	1.37 (1.12–1.66)	1.26 (1.03–1.54)	13.7	1.46 (1.21–1.76)	1.34 (1.11–1.63)
Wine preference	5.4	5.1	0.55 (0.32–0.94)	0.67 (0.39–1.16)	7.8	0.78 (0.50–1.22)	0.96 (0.61–1.51)
Other preferences ^d	11.5	13.7	1.62 (1.25–2.11)	1.55 (1.18–2.04)	12.9	1.37 (1.05–1.78)	1.34 (1.02–1.76)
Drinking pattern							
Low-risk consumption	49.7	5.5		1	6.1		1
At-risk RSOD or volume drinking	43.7	13.1		2.63 (2.14–3.24)	14.7		2.67 (2.19–3.25)
At-risk RSOD and volume drinking	6.6	26.3		6.10 (4.55–8.19)	27.7		5.81 (4.37–7.73)
Linguistic region							
German	45.2	8.8		1	9.9		1
French	54.8	11.3		1.32 (1.09–1.62)	12.4		1.33 (1.10–1.61)
Age							
<20	60.6	9.3		1	10.6		1
≥20	39.4	11.5		1.29 (1.07–1.57)	12.3		1.21 (1.01–1.46)
Education							
High school/university	21.2	7.6		1	9.8		1
Higher vocational school	28.7	11.2		1.58 (1.19–2.09)	11.7		1.22 (0.95–1.58)
Primary school	50.1	10.7		1.71 (1.31–2.23)	11.7		1.37 (1.08–1.75)
Residence							
Rural	61.5	8.9		1	10.6		1
Urban	38.5	12.2		1.45 (1.20–1.75)	12.3		1.20 (1.00–1.44)

Note: CI = 95% confidence interval; RSOD = risky single occasion drinking.

a: Unadjusted.

b: Adjusted.

c: Not drinking 2/3 of the total alcohol consumption as a single beverage type.

d: Preference for strong alcohol, ready to drink beverages or aperitifs.

alcohol-related consequences or the use of other substances was very strong.

The following limitations must be considered. First, women were not included in our sample, even though it can be assumed that the described associations are different for females.⁵ Second, we did not analyse longitudinal data and, hence, cannot draw causal inferences. Third, even though we included various socio-demographic variables in our statistical models, why beer preference is especially predictive of risky drinking behaviours and the use of illicit drugs warrants further study.

Conclusions

Even though Switzerland is overall a country in which drinking wine is relatively widespread, our results were consistent with certain already-published studies conducted in beer-preferring countries. That is, beer preference was associated both with riskier drinking behaviours and the use of illicit drugs. However, owing to the even more pronounced association between risky drinking patterns and negative outcomes, independent of beverage preference, major preventative strategies should still attempt to reduce total alcohol

intake. This being said, to lessen the additional negative effects of beer and strong alcohol, which are particularly cheap in Switzerland, targeted strategies such as minimum pricing policies for these beverage types should be considered.^{6,28}

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Key points

- A preference for beer was associated with riskier drinking behaviours (at-risk binge and/or volume drinking).
- Even after controlling for drinking pattern, a preference for beer or strong alcohol was related to the use of cannabis and other illicit drugs.
- Additionally, the likelihood of negative outcomes (alcohol-related consequences and the use of other substances) increased with the presence of one or, even more pronouncedly, two risky drinking behaviours.
- Because of the illustrated associations, it seems necessary for preventative programs to strive to reduce total alcohol intake. Furthermore, minimum pricing policies for beer and strong alcohol must be considered to reduce the negative effects associated with these beverage types.

References

- Naimi TS, Brewer RD, Miller JW, et al. What do binge drinkers drink? Implications for alcohol control policy. *Am J Prev Med* 2007;33:188–93.
- Siegel MB, Naimi TS, Creameens JL, Nelson DE. Alcoholic beverage preferences and associated drinking patterns and risk behaviors among high school youth. *Am J Prev Med* 2011;40:419–26.
- Berger DE, Snortum JR. Alcoholic beverage preferences of drinking driving violators. *J Stud Alcohol* 1985;46:232–9.
- Klatsky AL, Armstrong MA, Kipp H. Correlates of alcoholic beverage preference: traits of persons who choose wine, liquor or beer. *Br J Addict* 1990;85:1279–89.
- Makela P, Gmel G, Grittner U, et al. Drinking patterns and their gender differences in Europe. *Alcohol Alcohol* 2006;41:18–18.
- Meier PS, Purshouse R, Brennan A. Policy options for alcohol price regulation: the importance of modelling population heterogeneity. *Addiction* 2010;105:383–93.
- Jensen MK, Andersen AT, Sorensen TIA, et al. Alcoholic beverage preference and risk of becoming a heavy drinker. *Epidemiology* 2002;13:127–32.
- Lintonen TP, Konu AI. Adolescent alcohol beverage type choices reflect their substance use patterns and attitudes. *J Youth Adolesc* 2003;32:279–89.
- Smart RG, Walsh GW. Do some types of alcoholic beverages lead to more problems for adolescents? *J Stud Alcohol* 1995;56:35–8.
- Sutherland I, Willner P. Patterns of alcohol, cigarette and illicit drug use in English adolescents. *Addiction* 1998;93:199–208.
- Wicki M, Gmel G, Kuntsche E, et al. Is alcopop consumption in Switzerland associated with riskier drinking patterns and more alcohol-related problems? *Addiction* 2006;101:522–33.
- Gmel G, Truan P, Francois Y. Alcoholic beverage preferences and self-reported problems in Switzerland. *Subst Use Misuse* 1999;34:1619–45.
- Gmel G, Notari L, Aurélien G, Wicki M. Alcohol, Suchtmonitoring Schweiz / Jahresbericht – Daten 2011 (Alcohol, addiction monitoring in Switzerland / Annual Report – data 2011). Bern, 2012.
- Mortensen EL, Jensen HH, Sanders SA, Reinisch JM. Better psychological functioning and higher social status may largely explain the apparent health benefits of wine – a study of wine and beer drinking in young Danish adults. *Arch Intern Med* 2001;161:1844–8.
- World Advertising Research Center. *World Drink Trends 2005*. Oxfordshire, 2005.
- World Health Organization (WHO). *European Status Report on Alcohol and Health 2010*. Copenhagen, 2010.
- Annaheim B, Gmel G. *Alkoholkonsum in der Schweiz. Ein Synthesebericht zu Alkoholkonsum und dessen Entwicklung auf der Basis der Schweizerischen Gesundheitsbefragung [Alcohol consumption in Switzerland. A synthesis of alcohol consumption and its development based on the Swiss Health Survey]*. Lausanne: Schweizerische Fachstelle für Alkohol- und andere Drogenprobleme (SFA), 2004.
- Flensburg-Madsen T, Knop J, Mortensen EL, et al. Beverage preference and risk of alcohol-use disorders: a Danish prospective cohort study. *J Stud Alcohol Drugs* 2008; 69:371–7.
- Gronbaek M, Jensen MK, Johansen D, et al. Intake of beer, wine and spirits and risk of heavy drinking and alcoholic cirrhosis. *Bio Res* 2004;37:195–200.
- Kuntsche E, Knibbe R, Gmel G, Engels R. 'I drink spirits to get drunk and block out my problems...' beverage preference, drinking motives and alcohol use in adolescence. *Alcohol Alcohol* 2006;41:566–73.
- Rogers JD, Greenfield TK. Beer drinking accounts for most of the hazardous alcohol consumption reported in the United States. *J Stud Alcohol* 1999;60:732–9.
- Metzner C, Kraus L. The impact of alcopops on adolescent drinking: a literature review. *Alcohol Alcohol* 2008;43:230–9.
- Greenfield TK, Rogers JD. Alcoholic beverage choice, risk perception and self-reported drunk driving: effects of measurement on risk analysis. *Addiction* 1999;94: 1735–43.
- Bobak M, Room R, Pikhart H, et al. Contribution of drinking patterns of differences in rates of alcohol related problems between three urban populations. *J Epidemiol Community Health* 2003;58:238–42.
- Rehm J, Greenfield TK, Rogers JD. Average volume of alcohol consumption, patterns of drinking, and all-cause mortality: results from the US National Alcohol Survey. *Am J Epidemiol* 2001;153:64–71.
- Wechsler H, Nelson TF. Binge drinking and the American college student: what's five drinks? *Psychol Addict Behav* 2001;15:287–91.
- Smart RG. Behavioral and social consequences related to the consumption of different beverage types. *J Stud Alcohol* 1996;57:77–84.
- Booth A, Meier PS, Stockwell T, et al. *Independent Review of the Effects of Alcohol Pricing and Promotion. Part A. Systematic Reviews*. Sheffield: School of Health and Related Research, University of Sheffield, 2008.